

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A pixel cell comprising:

a substrate;

a ~~photosensor~~ pinned photodiode in said substrate, said ~~photosensor~~ pinned photodiode including a first conductivity area below a surface of said substrate and a second conductivity area at least between said first conductivity area and said substrate surface; and

a first material layer having an excess charge sufficient to create an electric field that affects said second conductivity area, wherein said first material layer is located above said surface of said substrate, at least over said ~~photosensor~~ pinned photodiode and comprises a material selected from the group consisting of aluminum oxide, aluminum nitride, and aluminum ~~silicates~~ silicate.
2. (Canceled).
3. (Currently amended) The pixel cell of claim 2 1, further comprising an isolation region spaced from said ~~photosensor~~ pinned photodiode, wherein said isolation region has a bottom and sidewalls, at least said sidewalls

having an associated second material layer having an excess charge sufficient to create an electric field which affects said second conductivity area.

4. (Previously Presented) The pixel cell of claim 1, wherein said first layer is aluminum oxide.
5. (Canceled)
6. (Previously Presented) The pixel cell of claim ~~5~~ 1, wherein said first layer is aluminum nitride.
7. (Previously Presented) The pixel cell of claim 1, wherein said first layer is an aluminum silicate.
8. (Canceled)
9. (Previously Presented) The pixel cell of claim 3, wherein said second conductivity area maintains holes at said

substrate surface and at a surface of said isolation region
sidewall.

10. (Previously Presented) The pixel cell of claim 3, wherein
said field prevents a depletion region of said photodiode
from reaching at least one of said isolation region and said
substrate surface.
11. (Canceled)
12. (Canceled)
13. (Canceled)
14. (Previously Presented) The pixel cell of claim 3, further
comprising a dielectric layer between said first material
layer and said substrate.
15. (Original) The pixel cell of claim 14, wherein said dielectric
layer comprises silicon dioxide.
16. (Currently amended) A pixel cell comprising:
a substrate having a first conductivity type;

a pinned photodiode in said substrate and having a charge collection region of a second conductivity type and an accumulation region of said first conductivity type at least over said charge collection region;

an isolation trench adjacent to said pinned photodiode, wherein sidewalls of said isolation trench have a charge density sufficient to maintain a field in an adjacent portion of said accumulation region and a surface of said substrate has a charge density sufficient to maintain an electric field in an adjacent portion of said accumulation region; and

a first material layer having a material selected from the group consisting of aluminum oxide, aluminum nitride, and aluminum ~~silicates~~ silicate on a surface of said substrate over said pinned photodiode.

17. (Previously Presented) The pixel cell of claim 16, wherein said sidewalls comprise a second material layer of high-k dielectric material.
18. (Original) The pixel cell of claim 17, wherein said first conductivity type is p-type and said second conductivity type is n-type.

19. (Original) The pixel cell of claim 18, wherein said charge density is negative charge density.
20. (Previously Presented) The pixel cell of claim 18, wherein said first and second layers have an excess negative charge.
21. (Currently amended) The pixel cell of claim 20, wherein said second material layer of high-k dielectric material is selected from the group consisting of aluminum oxide, aluminum nitride, and aluminum ~~silicates~~ silicate.
22. (Currently amended) The pixel cell of claim ~~20~~ 16, wherein said isolation trench is filled with a high-k dielectric material having ~~an excess negative charge~~ a negative charge density sufficient to maintain a field in an adjacent portion of said accumulation region.
23. (Currently amended) The pixel cell of claim 17, wherein said sidewalls and said surface of said substrate further

comprise a layer of dielectric material between each of said
first and second material layers and said substrate.

24. (Original) The pixel cell of claim 23, wherein said dielectric
material is silicon dioxide.

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Previously Presented) The pixel cell of claim 16, further
comprising a silicon dioxide layer located under said first
material layer and in contact with said substrate.

30. (Currently amended) An imager device comprising:

an image processor; and

a pixel array for supplying signals to said image processor,

at least one pixel of said array comprising:

a substrate;

a photodiode within said substrate;

an isolation trench within said substrate;

a lining layer in said isolation trench, comprising a layer of high-k dielectric material; and

a surface layer on a surface of said substrate located over said photodiode, comprising a layer of high-k dielectric material selected from a group consisting of aluminum oxide, aluminum nitride, and aluminum ~~silicates~~ silicate.

31. (Original) The imager device of claim 30, further comprising a dielectric layer between said isolation trench and said lining layer.
32. (Original) The imager device of claim 31, wherein said dielectric layer extends over said surface of said substrate, between said surface layer and said surface of said substrate.
33. (Original) The imager device of claim 31, wherein said dielectric layer comprises silicon dioxide.

34. (Original) The imager device of claim 30, wherein said lining layer has an excess charge sufficient to maintain a field in a first portion of an accumulation region of said photodiode.
35. (Previously Presented) The imager device of claim 34, wherein said surface layer has an excess charge sufficient to maintain a field in a second portion of said accumulation region of said photodiode.
36. (Currently Amended) The imager device of claim 35, wherein said lining layer is a high-k dielectric material selected from a group consisting of aluminum oxide, aluminum nitride, and aluminum ~~silicates~~ silicate.
37. (Original) The imager device of claim 30, further comprising a filling layer located over said lining layer, filling said isolation trench.

38. (Previously Presented) The imager device of claim 37,
wherein said filling layer is selected from a group consisting
of silicon dioxide, silicon nitride, oxide-nitride, nitride-
oxide, and oxide-nitride-oxide.
39. (Previously Presented) A pixel cell comprising:
a photodiode in a substrate;
a first layer of aluminum oxide on said substrate over said
photodiode;
an isolation trench in said substrate and having a bottom
and sidewalls adjacent to said photodiode;
a layer of silicon dioxide on said bottom and said sidewalls
of said isolation trench; and
a second layer of aluminum oxide over said layer of silicon
dioxide.
40. (Previously Presented) The pixel cell of claim 39, further
comprising a layer of silicon dioxide between a surface of
said substrate over said photodiode and said first layer of
aluminum oxide.

41. (Canceled)

42. (Original) The pixel cell of claim 39, wherein said isolation trench is filled with aluminum oxide.

Claims 43-66 (Canceled).

67. (Previously Presented) The pixel cell of claim 16, wherein said first layer is aluminum oxide.

68. (Previously Presented) The pixel cell of claim 16, wherein said first layer is aluminum nitride.

69. (Previously Presented) The pixel cell of claim 16, wherein said first layer is an aluminum silicate.

70. (Currently amended) The ~~pixel cell~~ imager device of claim 30, wherein said ~~first~~ surface layer is comprises aluminum oxide.

71. (Currently amended) The ~~pixel-cell~~ imager device of claim 30, wherein said ~~first~~ surface layer is comprises aluminum nitride.

72. (Currently amended) The ~~pixel-cell~~ imager device of claim 30, wherein said ~~first~~ surface layer is comprises an aluminum silicate.